

# Nail

## - The epidermal components of Nail organ:

- 1 - nail matrix → produce nail plate
- 2 - proximal matrix → produce dorsal nail plate
- 3 - Distal matrix → (luna) → produce ventral nail plate
- 4 - proximal nail fold → responsible for the nail matrix protection
- 5 - Nail bed and hyponychium → Responsible for → nail plate adhesion and distal detachment

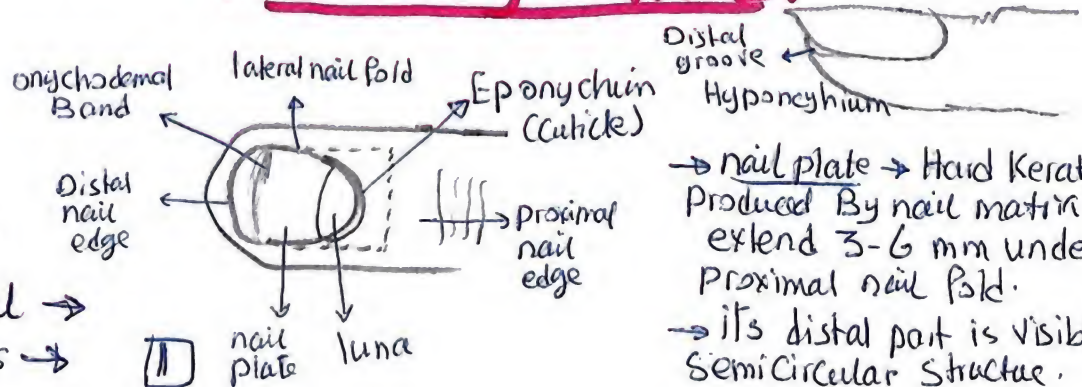
## - Nail growth Rate:

- Finger Nail → 3 mm / month
- Toenail → 1 mm / month
- each epidermal component of nail → Can be affected by several diseases →

## - Nail signs :

- Beau's line • pitting • longitudinal ridging
- Longitudinal Pissuring • Trachyonychia → D.t proximal matrix affection
- True leukonychia → D.t distal matrix affection
- Onychomadesis → Koilonychias
- Nail thinning D.t → proximal - distal matrix affection
- Onycholysis • subungual Hyperkeratosis
- apparent leukonychia • splinter Hge.

## • Anatomy of Nail:



- nail plate → Hard Keratin → Produced By nail matrix extend 3-6 mm under the proximal nail fold.
- its distal part is visible → white Semicircular Structure.



## Epidermal components of the nail organ

Epidermal component	Keratinization	Horny end product
Matrix	Without granular layer.	Nail plate.
Nail bed		Cells added to underside of nail plate.
Proximal nail fold & dorsum of digit	With granular layer.	Cuticle.
Hyponychium & volar surface		Few horny cells added to underside of nail plate distally.

## - Classifications of Nail Disorders :-

### I Genetic disorders :-

#### A) Congenital :

##### • Limited to Nail

- Anonychia → absence of nail
- Koilonychia → Spoon-nails
- Micronychia → Small nails
- Polyonychia → more than one nail on a digit
- Racquet Nail → Deformity → short Broad flat nail

##### • As a part of Syndrome

- Ectodermal Dysplasia (hidrotic anhidrotic)
- Pachyonychia Congenita (thickening Nail plate)
- Focal dermal Hypoplasia
- Dolichonychia :- elongated - slender nails  
occur → Marfan Syndrome  
→ Ehler-Danlos

#### B) Hereditary (Develop after Birth)

1. Darier disease
2. Tuberosus sclerosis
3. Epidermolysis bullosa
4. Progeria

5. Peutz-Jegher
6. Dyskeratosis congenita
7. Poikiloderma congenita
8. Incontinentia pigmenti

## - Function of Nail :

1. protect the fingertips from traumatic impact
2. enhance fine touch & improve tactile sensitivity
3. aid in picking-up small objects
4. used as Both offensive - defensive weapons
5. excellent tools for scratching to relieve itching
6. extension of their esthetic beauty



• Proximal portion of nail matrix → produce the dorsal portion of nail plate

• The Distal matrix is Responsible for the production of ventral nail plate

↓  
Surgery to Distal matrix → preferable to Surgery to Proximal matrix

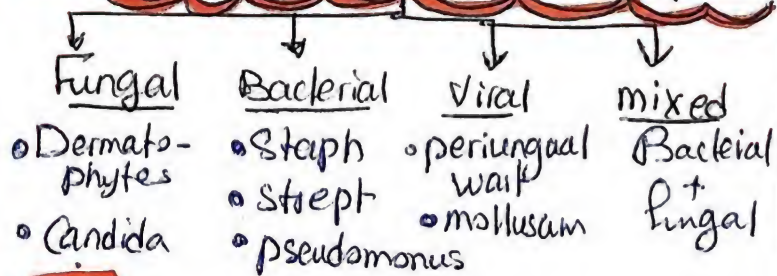
• If there is Scarring & Surgery to distal matrix it will be to the undersurface of nail plate [2]



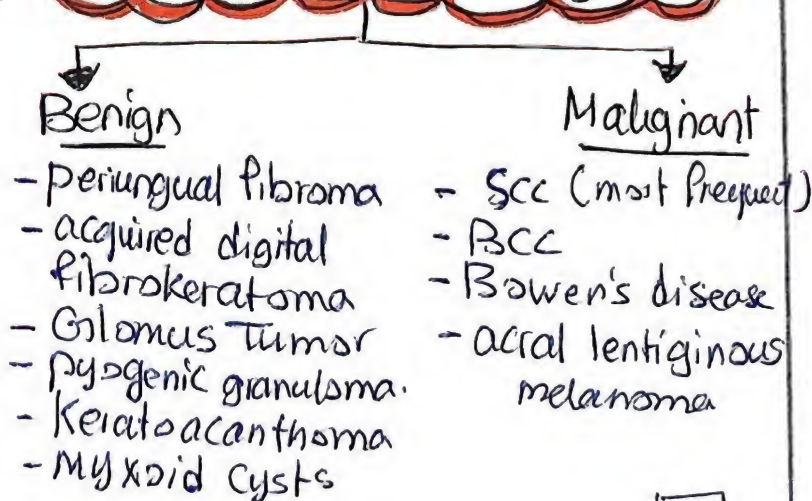
## 9- Nail - patella Syndrome:

- autosomal dominant disorder
- Anonychia of thumb nails
- Triangular lunulae on other digits
- Hypoplastic patellae
- Subluxated radial heads
- iliac Horns
- Nephropathy

## II Infectious disease of Nail:



## III Neoplasm (subungual):



[3]

## ABCDEF rule for clinical suspicion of nail melanoma

A	<ul style="list-style-type: none"> <li>• Age (peak incidence: 5th to 7th decades of life).</li> <li>• African-Americans, Asians &amp; Native Americans (1/3 of all nail melanoma cases).</li> </ul>
B	<ul style="list-style-type: none"> <li>• Brown to black.</li> <li>• Breadth (3 mm or wider).</li> <li>• Borders (variegated).</li> </ul>
C	<ul style="list-style-type: none"> <li>• Change in the nail band (color/size).</li> <li>• Lack of change in the nail morphology despite presumed adequate treatment.</li> </ul>
D	<ul style="list-style-type: none"> <li>• Digit most commonly involved (thumb and big toe).</li> </ul>
E	<ul style="list-style-type: none"> <li>• Extension of the pigment into the proximal &amp;/or lateral nailfold (Hutchinson's sign).</li> </ul>
F	<ul style="list-style-type: none"> <li>• Family or personal history of dysplastic nevi or melanoma.</li> </ul>

## IV Nail Changes in Skin disease:

### 1- Psoriasis:

pitting - ridges - Onycholysis - Subungual Keratosis  
oil-drop bellow nail - Pustular forms of psoriasis

### 2- Parakeratosis pustulosa:

- mild variety of nail psoriasis OR - manifestation of atopic or Contact Dermatitis

### 3- CP:

• psoriasiform nail changes - mainly in children, one nail  
• H: Emollients, Topical Retinoids

### 4. Alopecia areata:

- pitting - Longitudinal Ridging - thickening

### 5- lichen planus:

- Longitudinal Ridging - Striations - Thinning - permanent loss



6- pterygium (wing-like)

- Focal loss of matrix & absence of nail plate • adhesion of the proximal nail fold skin to nail bed

- Occur typically in LP But also found

in

↳ GIVHD  
↳ dyskeratosis congenita

7- pityriasis rubra pilaris (PRP)

- Thickening - Brittleness - Striation of nails

8- Connective tissue disorders :-

↳ Dermatomyositis :- nail fold Telangiectasis

↳ Scleroderma :- pterygium inversus unguis

↳ Longitudinal over-curvature

↳ (ventral pterygium)

• occur when there is fusion of the hyponychium with undersurface of nail plate → obliterating the distal groove

(the nail plate doesn't separate distally)

- occur mainly in acrosclerosis

- where the fingertips Ulceration and scarring contribute to the inability of the nail to separate

9- Longitudinal over-curvature :-

- Result from: Loss of soft tissue

- Chch : feature of : Systemic Sclerosis

10- Amyloidosis

11- Chronic allergic contact dermatitis and Atopic dermatitis

12- Aging changes of the nail

V) Nail changes characteristic of systemic diseases

Area involved	Nail disorder	Associated disease
Plate	Mees strips (Transverse lines of entire nail breadth in all nails).	Arsenic poisoning, trauma, medications, severe illness.
Bed	Splinter hemorrhages.	Bacterial endocarditis.
	Muehrcke's lines (transverse double white lines) parallel to lunula.	Nephrotic syndrome, hypoalbuminemia, chemotherapy.
	Terry's nails (proximal 2/3 white nail color, distal 1/3 brown-pink band).	Liver cirrhosis, hypoalbuminemia, diabetes, cardiac disease.
	Half-and-half nail (Lindsay's nails) (red distal half & white proximal half).	Chronic renal failure.
Matrix	Blue lunulae.	Wilson's, drugs, PUVA, argyria.
	Red lunulae (pink to red spots within lunula).	Alopecia areata, rheumatoid arthritis, LE, congestive heart failure, CO poisoning.
Plate / matrix	Clubbing.	Pulmonary disorders.
	Spoon nails.	Iron deficiency anemia.




## ★ Hutchinson's sign:

1. Brown-Black periungual pigmentation
2. Sign of nail melanoma
3. Commonly observed in melanocytic Nevi
4. Should distinguished from:

Pseudo-Hutchinson's sign  
 ↳ Dark bands producing "illusory" pigment of the proximal nail fold  
 Due to Cuticle transparency.

## ★ Clubbing "Hippocratic nails"

- ↑↑ Curvature of nail plate in Both Lateral and Longitudinal plane
- + Loss of the normal angle Between the nail plate  and Proximal Nail Folds

### - Causes:

#### ↳ Idiopathic

- Hereditary
- Pachydermo-periostosis

#### ↳ 2ry to

- Vascular abnormalities
- Cardiopulmonary disease
- Hypertrophic osteoarthropathy

[5]

→ Bone Pain + malignant chest tumor  
 + peripheral neurovascular disease

## ★ Yellow Nail Syndrome ★

= Pulmonary disorder + lymphedema  
 + yellow-slow growing nails & Abscent of lunulae

### Drug-induced nail abnormalities

Beau's line and onychomadesis	Chemotherapeutic agents.
True leukonychia	Chemotherapeutic agents.
Nail thinning and brittleness	<ul style="list-style-type: none"> <li>• Chemotherapeutic agents.</li> <li>• Retinoids.</li> </ul>
Onycholysis/photo-onycholysis	<ul style="list-style-type: none"> <li>• Chemotherapeutic agents, particularly taxanes.</li> <li>• Tetracyclines.</li> <li>• Psoralens.</li> <li>• NSAIDs.</li> </ul>
Apparent leukonychia (e.g. Muehrcke's nails)	Chemotherapeutic agents, particularly polychemotherapy including anthracyclines, vincristine.
Melanonychia	<ul style="list-style-type: none"> <li>• Chemotherapeutic agents.</li> <li>• Psoralens.</li> <li>• Zidovudine (AZT).</li> </ul>
Discoloration (non-melanin)	<ul style="list-style-type: none"> <li>• Minocycline.</li> <li>• Antimalarials.</li> <li>• Gold.</li> </ul>
Paronychia and periungual pyogenic granulomas	<ul style="list-style-type: none"> <li>• Retinoids.</li> <li>• Antiretroviral drugs (indinavir, efavirenz, lamivudine).</li> <li>• Epidermal growth factor receptor (EGFR) inhibitors (cetuximab, gefitinib, erlotinib, panitumumab).</li> <li>• Methotrexate.</li> <li>• Capecitabine (prodrug of 5-fluorouracil).</li> <li>• Sirolimus.</li> </ul>
Ischemic changes	<ul style="list-style-type: none"> <li>• Beta-blockers.</li> <li>• Bleomycin.</li> </ul>



## VI Nail changes Due to Chemical or Mechanical Trauma:-

- ① Occupational → weavers, musicians  
→ photographers
- ② Self-induced:
  - Onychophagy (nail biting)
  - excessive manicuring

## \* Onychocryptosis \*

(ingrowing toe nail)

• Occur when: The free edges of the nail plate → penetrate through the soft tissue of the nail fold → 2ry infection

• Predisposing factors:

- excessive rotation of toe
- onycholysis along nail margin
- ill-fitting shoes
- poor cutting of the nail

## \* Retronychia \*

- variant of ingrowing nail → upward growing of shedding nail into ventral surface of proximal nail fold

## \* Dystrophia mediana Canaliformis \*

median canaliform dystrophy of Heller  
Solomonichia \*

- deep longitudinal split or canal in the nail plate
- mainly of the thumb nail D.t → Trauma

## \* Onychoschizia \*

- Splitting or lamination of the nail plate in the horizontal plane
- Commonly seen: in housewives and with wet occupations

## \* Onychogryphosis \*

- Hypertrophy of the nail with prolongation and curvature
- Occur in toe nails → specially Big Toe.
- mostly in elderly
- as a result of ill-fitting foot-wear and neglect.



## \* Pincer nails (Trumpet nail)


- 1- nail bed pinching by over-curved nail bed plate
- 2- Toenails most frequently affected
- 3- Severe pain
- 4- Subungual exostosis → excluded by X-ray examination

Correlation of nail findings with anatomic site of nail damage	
Affected site	Clinical manifestation
Proximal matrix	<ul style="list-style-type: none"> <li>• Beau's lines.</li> <li>• Pitting.</li> <li>• Longitudinal ridging.</li> <li>• Longitudinal fissuring.</li> <li>• Trachyonychia.</li> </ul>
Distal matrix	<ul style="list-style-type: none"> <li>• True leukonychia.</li> </ul>
Proximal + distal matrix	<ul style="list-style-type: none"> <li>• Onychomadesis.</li> <li>• Koilonychia.</li> <li>• Nail thinning.</li> </ul>
Nail bed	<ul style="list-style-type: none"> <li>• Onycholysis.</li> <li>• Subungual hyperkeratosis.</li> <li>• Apparent leukonychia.</li> <li>• Splinter hemorrhages.</li> </ul>

## • Nail Signs •

### A) D.t abnormal nail matrix:

#### ① Beau's lines:

- Transverse lines or "Grooves of the nail plate" 
- Occur when there is temporary Cessation of nail growth.
- It's the most common But least Specific nail changes seen in systemic diseases

#### • Causes:

- 1- previous illness
- Fever
  - chronic eczema
  - Trauma
  - Occupational
  - Chronic paronychia
  - Raynaud's Disease

• It's possible to pinpoint the date of illness By the distance of the groove from the proximal nail fold  
 → normally → nail plate takes 3-4 months to grow from its Base to its distal edges



## ② Nail pitting <sup>basal</sup>

- D.f: Shallow depressions in the nail plate that Result of: abnormally retained nuclei of the keratin-forming cells which shed with growth.



### - Types:

#### Deep

- pits are deep - large randomly placed :-
- e.g: nail psoriasis

#### Shallow:

- pits are small - uniform arranged in "Cross-hatched" pattern
- e.g: Alopecia areata

### - Other Common Causes of pitting:

- Eczema • Trauma • alopecia areata
- Lp • Reiter's disease -

## ③ Onychorrhexis

- Narrow - Longitudinal parallel striations of the nail plate
- Causes: • Aging • Lp • twenty nail Dystrophy
- AA • Darier disease • myxoid cyst.

## ④ Trachyonychia (twenty nail Dystrophy) (sandpapered nails)

- Excessive Longitudinal ridging → Producing nail Roughness
- Causes: • Alopecia areata • lichen planus • psoriasis • eczema

## ⑤ True leukonychia:-

- D.f: The nail plate has normal surface But Loses → its transparency → Look white : Because of: presence of parakeratotic cells within its ventral portion
- Caused By: Diseases that disturb distal nail matrix keratinization

### - 3 morphological Variants of True leukonychia

#### △ punctate leukonychia <sup>low</sup>

- The nail plate show → small opaque white spots → that move distally with nail growth
- Sometimes → disappear before Reaching The distal nail
- Caused By: Trauma - in children



## △ Striate leukonychia:



- The nail plate show → multiple transverse white opaque parallel lines
- Observed in: Fingernails of women.
- Caused By: Matrix Trauma 2ry to manicures
- Occur in: great toenails as a Consequence of: Trauma from shoes
- typical of Mee's lines: the white Transverse Bands seen in arsenic poisoning and fever.

## △ Diffuse leukonychia:

- The nail plate → Completely or almost Complete → Opaque and white
- Total leukonychia is Rare
- Sometimes Hereditary
- may be associated with: Keratoderma  
↳ Congenital defects: deafness

## △ False leukonychia:

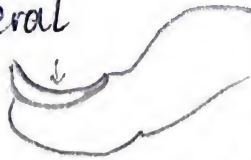
Result from onycholysis or involvement of The tissue beneath the nail

## ⑥ Onychomadesis (nail Shedding)

- Detachment of the nail plate from proximal nail fold
- Due to: severe insult that produces a complete arrest of nail matrix activity.
- Causes: The same as those for Beau's lines

## ⑦ Koilonychia: (spoon nail)

- The nail plate → Thinned, flat, spoon shaped
- Due to: upward eversion of its lateral edges.
- It's physiological in children
- in Adults: it's commonly Occupational in origin or associated with Iron deficiency.



## B) Not abnormal nail Bed:

### ① Onycholysis:

- The nail plate → detached from nail Bed
- appear: white → Due to: presence of air in The subungual space
- pigmentation of onycholytic area → occur as a consequence of microbial colonization or Blood extravasation



- Photo-onycholysis: precipitated By UV light exposure, either alone or in combination with medications: Tetracycline

### • Causes:

- 1- Environmental → infant water.
  - trauma • UV-exposure
- 2- Primary Skin disorders →
  - psoriasis - LP - eczema
- 3- Infections →
  - Candida (2<sup>ry</sup> invader), dermatophytes
  - MPV - Scabies
- 4- Drugs →
  - Tetracycline - Taxanes → Cause Hgic onycholysis & subungual abscess
- 5- Metabolic disorders →
  - Hyperthyroidism
- 6- Tumors → subungual exostoses + SCC

## ② Onychauxis:-

- Hypertrophy of the nails → nail thickening
- Causes:
  - psoriasis - LP - Dermatophytes infection
  - pachyonychia Congenita
  - subungual Hyperkeratosis

(10)

## ③ Apparent leukonychia

- white discoloration → fade @ pressure
- The nail → white Beard: abnormalities in the color of the nail Bed
- doesn't move distally with nail growth
- nail plate transparency maintained
- Due to: Drugs: chemotherapeutic agents
  - ↳ Systemic diseases: Hypoalbuminemia

## ④ Splinter Hemorrhage:-

- Due to: the extravasation of Blood from the longitudinally oriented vessels
- Due to: Trauma to the nail.
- arise in the distal portion
- The occurrence close to the lunula and in multiple nails Correlates more directly with Systemic disease
- e.g.: subacute Bacterial endocarditis
  - Drug Reactions
  - Vasculitis
- Splinter Hg is not always a sign of Bact. endocarditis, Trauma → is more common



## Nail discoloration (Chromonychia)

Other nail discoloration	Causes
Leukonychia "white nails"	<ul style="list-style-type: none"> <li>• True leukonychia (Page 108).</li> <li>• Apparent leukonychia (Page 110).</li> </ul>
Black or dark brown	<ul style="list-style-type: none"> <li>• Nevi.</li> <li>• Trauma (e.g. during sports) to nail bed → subungual hematoma.</li> <li>• Subungual melanoma.</li> <li>• Fungal infection, e.g. Hendersonula &amp; scopulariopsis or T. rubrum.</li> <li>• Addison's disease.</li> <li>• Post-radiation.</li> <li>• Hemochromatosis.</li> <li>• Drug-induced, e.g. gold, arsenic intoxication, cytotoxic drugs, zidovudine in AIDS patients.</li> <li>• Peutz-Jeghers syndrome.</li> <li>• AIDS patients (longitudinal pigmentary bands).</li> </ul>
Green	<ul style="list-style-type: none"> <li>• Pseudomonas infection.</li> <li>• Candidal infection.</li> <li>• Aspergillus infection.</li> </ul>
Yellow	<ul style="list-style-type: none"> <li>• Candidal Infection.</li> <li>• Slow growth.</li> <li>• Yellow nail syndrome (Triad of lymphedema of the lower limbs, pleural effusions and thickened yellow nail).</li> <li>• Drug-induced, e.g. tetracycline.</li> </ul>
Blue	<ul style="list-style-type: none"> <li>• Drug-induced, e.g. antimalarials, minocycline.</li> <li>• Wilson's disease.</li> <li>• Ochronosis.</li> <li>• Exposure to silver nitrate.</li> </ul>

## \* Causes of painful Nail: \*

- ① Trauma:
  - subungual hematoma
  - ingrown toenail
- ② Acute - chronic inflammation:
  - paronychia
  - acropustulosis
  - herpetic whitlow

II

- ③ Tumors:
- melanoma
  - subungual fibroma
  - glomus tumor

## ④ Subungual exostosis:

Firm - tender - Subungual nodule → elevates the nail plate

- The nodule → may ulcerate OR become Hyperkeratotic
- The diagnosis → confirmed By X-ray

## \* DD Between subungual melanoma and subungual Hematoma (onychohematoma)

\* Both Conditions → Cause pain

\* High suspect of Melanoma if -

- 1- pigment develop in a single nail of an old pt.
- 2- Any band in the nail wider at Base
- 3- Hutchinson's Sign
- 4- Epiluminescence microscopy

## \* Hematoma Pigment:

- Remain confined to nail Bed - gradually grows ~~up~~ out with the nail
- Ht → Pass a tip of heated paper clip through the nail into hematoma → pressure + pain Relief.



# ★ Causes of inflammation of the Nail Fold ★

● Acute paronychia ← Staph  
Strept

● Chronic paronychia: E. coli

D.t → Bacteria - yeasts

Result from → Separation of the cuticle  
leading to → loss of its waterproof  
properties → swelling of nail fold.

● Habitual sucking of finger in  
children → predispose.

● Eczema:

● Psoriasis plaque-pustular form

● Sarcoidosis

● Collagen disorders :-

Telangiectatic vessels on the proximal  
nail fold.



### Nail colors:

1. Yellow: lymphedema, nicotine stains, onychomycosis
2. Orange- brown: hemochromatosis, Addison's disease, hyperthyroidism
3. Blue: Wilson's disease, cyanosis
4. Grey-brown: tetracycline, minocycline, argyria
5. Green : pseudomonas infection
6. Black: hemorrhage, melanoma
7. Salmon-orange: psoriasis
8. Half & half : renal disease

Nail manifestations	
Psoriasis	Pitting, oil drop, onycholysis, subungual hyperkeratosis
Lichen planus	Ridging, striations, twenty nail syndrome, pterygium
Alopecia areata	Pitting, longitudinal ridging, thickening
Sarcoidosis	Clubbing, onycholysis, subungual hyperkeratosis, , dystrophy, bone cysts
Dermatomyositis	Periungual telangiectasia with ragged cuticle (Samitz sign)
<u>Darier's disease</u>	Red or white longitudinal bands, distal angular notch, <i>-splitting Nail plate</i> onycholysis, <u>fragility</u> , <u>subungual hyperkeratosis</u>
Tuberous sclerosis	Subungual & periungual fibromas, longitudinal grooves, splinter hge, white streaks
Scleroderma	Pterygium inversus unguis, longitudinal over curvature
Acrodermatitis enteropathica	Chronic paronychia, dystrophic nails